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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/622,966	07/18/2003	Michael Stanley DeCourcy	A01398	4021

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PATENT DEPARTMENT
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EXAMINER

PRICE, CARL D

ART UNIT PAPER NUMBER

3749

DATE MAILED: 12/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Pat

Office Action Summary	Application No. 10/622,966	Applicant(s) DECOURCY ET AL.	
	Examiner CARL D. PRICE	Art Unit 3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07/18/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-10 have been considered but are moot in view of the new ground(s) of rejection.

Applicant has amended the claims to be of a scope not previously considered. Consistent with applicant's argument that the prior art relied on in the previous office action fail to show, disclose and/or teach certain aspects of applicant's invention now recited in the claims filed on 10/11/2005, applicant has amended the claims to include the following:

- A method for “*minimizing formation of nitrogen oxides in an incineration apparatus*” comprising the steps of:”

In this regard applicant further argues that the combustion step, occurring in the combustion heater (31) and/or catalytic combustor (35), in the method disclosed by **US003977832 (Schofield)** is not the same as that intended to occur in applicant's claimed “incineration apparatus”. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., “the incinerator destroys the waste materials” (VOCs) in the waste stream by pyrolysis”) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). In this regard applicant's remarks (page 8, beginning at line 2) include the following:

“Schofield states that ‘the gas is treated with a suitable reductant, such as natural gas or other hydrocarbon fuel’ in the presence of ‘noble metal or other suitable catalyst promoting the desired reduction of NO_x’, whereby the NO_x is reduced to elemental nitrogen (see Schofield, Col. 1, lines 43-45, and Col. 4, lines 30-32). This catalytic combustion described in Schofield is different from, and is not analogous to,

the incineration step of the method of the present invention. Paragraph (0039) of the present specification, US'149, explains that the incinerator destroys the waste materials (VOCs) in the waste stream by pyrolysis, which is an oxidative reaction not requiring a catalyst, whereas the catalytic combustion of Schofield is reductive and requires a catalyst. They are very different.”

However, in the last full paragraph of page 8 of Applicant’s original filed specification, Applicant discloses the following:

“The purpose of the incinerator is to destruct and or produce pyrolysis of the volatile organic compounds (VOC's) in the waste in accordance with environmental regulations. A conventional incinerator step feeds atmospheric air, generally natural gas as a fuel, and the preheated waste stream 24 into a firebox. The fuel may also comprise other conventional liquids, gaseous, or solid fuels, either alone or in combination.”

Based on applicant’s own definition of a “conventional incinerator” the Examiner cannot agree with applicant’s conclusion that the combustion described in **US003977832 (SCHOFIELD)** is different from, and is not analogous to, the incineration step of the method of the present invention. In this regard applicant’s attention is directed to the combustion heater (31) and catalytic combustor (35) of **US003977832 (SCHOFIELD)** which discloses the structural and functional equivalent to applicant’s claimed and disclosed “incineration apparatus”. That is, the combustion heater (31) and/or the combustion catalyst (35) **US003977832 (SCHOFIELD)** include “conventional incinerator” components not unlike those disclosed by applicant. **US003977832 (SCHOFIELD)** includes the method step of feeding atmospheric air (17), a gas fuel (32,36; “H₂” and “fuel gas”), and the preheated waste stream (23) into a firebox (31 and/or 35). Indeed, **US003977832 (SCHOFIELD)** discloses the following regarding “*minimizing formation of nitrogen oxides*”:

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(7) The discharged tail gas passes through a preheater 28 for indirect heat exchange with steam and then further raised in temperature in exchanger 22 by hot product gas from 20 and 21. The tail gas thus pre-heated passed by line 30 to a direct fired heater 31, for further temperature elevation. Fuel for heater 31 is furnished by a line 23, while the oxygen needed for combustion thereof is supplied to the heater by line 17. To increase available energy in the products of combustion from heater 31, steam may be injected by line 33.

(8) The **total effluent from heater 31**, in addition to the added steam and products of fuel combustion, will **contain oxides of nitrogen (NO.sub.x)** which are deleterious both from the standpoint of their effect on the turbine parts as well as their pollution on discharge to the atmosphere. It is therefore common practice to convert these nitrogen oxides to innocuous gas by reduction to elemental nitrogen. Such reductions of NO.sub.x in the gas stream discharged from 31 is carried out by catalytic combustion in a NO.sub.x abatement unit 35, wherein the gas is treated with a suitable reductant; such as natural gas or other hydrocarbon fuel, admitted thereto by line 36. If available and so desired, the reductant hydrocarbon fuel admitted to abatement unit 35, may be supplemented with hydrogen-containing off gas. Abatement unit 35 contains noble metal or other suitable catalyst promoting the desired reduction of NO.sub.x. In unit 35 also, remaining oxygen in the gas stream from heater 31 is consumed in combustion of the hydrocarbons and any free hydrogen to CO.sub.2 and water. As a result of the several reactions taking place in unit 35 the temperature of the gas is further increased, and is then discharged through line 37 into the expansion gas turbine 11 driving the third stage air compressor 10 of system 2. The discharge gas from turbine 11 passes successively through turbines 8 and 4, and is finally discharged to stack through line 40.

The claimed invention is therefore not patentably different than the apparatus and method disclosed by **US003977832 (SCHOFIELD)**. The **US003977832 (SCHOFIELD)** apparatus and method operating to minimize formation of nitrogen oxides by directing the preheated stream (23) into a combustor or incinerator (31, 35).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Concerning the drawings being objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims, notwithstanding applicant's remarks that:

"... As evidenced in part by the Examiner's own citation of Eagle et al, the features recited in Claims 6 and 7 (i.e., shell and tube heat exchanger with a series of disk-shaped and donut-shaped baffles, etc.) are conventional, well-known features. Shell and tube type heat exchangers are well-known. It is also conventional and well-known among persons of ordinary skill for such heat exchangers to have a series of disk-shaped and donut-shaped baffles configured such that the flow of the hot mixed gas will alternate back and forth across the tubes of the heat exchanger.

Applicants and their attorney believe that a detailed illustration of these features, recited in dependent Claims 6 and 7, is not essential for a proper understanding of the present invention, the critical features of which are recited in amended independent Claim 1. Rather, the subject matter of dependent Claims 6 and 7 represent only one embodiment of the present invention. Thus, it is believed that the current representation of the heat exchanger in the existing drawings as a rectangular box labeled 200 and referred to in the present specification as the "heat exchanger section" is sufficient to meet the requirements of 37 C.F.R. 1.83(a) without modification or amendment."

The ***"shell and tube exchanger comprises a shell portion and a tube portion, and a series of disk-shaped and donut-shaped baffles disposed within the shell and tube exchanger's shell portion, said series of disk-shaped and donut-shaped baffles being configured such that the hot mixed gas alternates across the tubes of said shell and tube exchanger."*** (claims 6 and 7) must be shown or the feature(s) canceled from the claim(s).

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the ***"shell and tube exchanger comprises a shell portion and a tube portion, and a series of disk-shaped and donut-shaped baffles disposed within the shell and tube exchanger's shell portion, said series of disk-shaped and donut-shaped baffles being configured such that the hot mixed gas alternates across the***

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tubes of said shell and tube exchanger.”(claims 6 and 7). must be shown or the feature(s) canceled from the claim(s). **No new matter should be entered.**

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4, 5, 8-10: Rejected under 35 U.S.C. 102(b)

Claims 1, 2, 4, 5 and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by US003977832 (SCHOFIELD).

US003977832 (SCHOFIELD) discloses a method for reducing the emission of gaseous products into the atmosphere:

“(8) The total effluent from heater 31, in addition to the added steam and

products of fuel combustion, will contain oxides of nitrogen (NO.sub.x) which are deleterious both from the standpoint of their effect on the turbine parts as well as their pollution on discharge to the atmosphere. It is therefore common practice to convert these nitrogen oxides to innocuous gas by reduction to elemental nitrogen. Such reductions of NO.sub.x in the gas stream discharged from 31 is carried out by catalytic combustion in a NO.sub.x abatement unit 35, wherein the gas is treated with a suitable reductant, such as natural gas or other hydrocarbon fuel, admitted thereto by line 36."

The method of **US003977832 (SCHOFIELD)** includes the steps of:

- a. producing a reaction product comprising a hot mixed gas stream (not referenced) by feeding a reaction feed mixture through an inlet of a reaction vessel (20), and passing the reaction product through an outlet of the reaction vessel;
- b. producing a cooled mixed gas stream (at 21, 22 and 23) by directing the hot mixed gas stream through a heat exchanger system;

In this regard **US003977832 (SCHOFIELD)** discloses:

"(4) Air stream 14, as illustrated, is subdivided into several branch streams designated 15, 16, and 17, respectively. Stream 15 furnishes the air used in an oxidation of ammonia. Thus, stream 15 is admixed with ammonia introduced by line 18 into catalytic converter 20, in which the initial oxidation takes place over known noble metal catalyst, forming oxides of nitrogen, chiefly NO. The gas stream of reaction products from converter 20 is passed through a waste heat boiler 21 in which the stream is initially cooled, and then through a heat exchanger 22 and cooling condensor 23, for further lowering of the temperature prior to admission of the thus cooled gas stream in absorber tower 24.

(5) Water is admitted to absorber 24 by a supply line 25. As the NO-containing gas stream is successively cooled at 21, 22 and 23 in the presence of excess oxygen, at least the major portion of the NO is converted to NO₂..."

- c. separating the cooled mixed gas stream into a cooled crude product stream (26) and a cooled waste stream (27);
- d. producing a preheated waste stream (30) by directing the cooled waste stream through the heat exchanger system (22); and

e. incinerating the preheated waste stream by directing it into an incinerator (35);
and

wherein separation of the cooled mixed gas stream into the cooled crude product stream and the cooled waste stream comprises passing the cooled mixed gas stream into a separator column (24);

wherein the gaseous emissions comprise at least one of the following:
nitrogen dioxide, nitric oxide, and carbon monoxide;

wherein the preheated waste stream is incinerated through the use of a preheated supplemental fuel and a preheated oxygen-containing stream produced in heater (31).

The combustion heater (31) and catalytic combustor (35) of **US003977832 (SCHOFIELD)** are deemed to be the structural and functional equivalent to applicant's claimed "incineration apparatus".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-5, 8-10: Rejected under 35 U.S.C. 103(a)

Claims 1-5 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the conventional industrial processes disclosed by applicant on pages 1-2 of the specification (Referred to hereinafter as “**Conventional Acrylic Acid Industrial Processes**”) in view of US003977832 (SCHOFIELD).

The **Conventional Acrylic Acid Industrial Processes** disclosed by applicant comprise:

Methods of making products such as acrylic acid from propylene, a reaction feed mixture, typically comprising propylene, oxygen, and optionally water, or nitrogen or other inerts. A two-stage catalytic reactor is typically utilized to oxidize the propylene to acrolein in a first reactive stage, and to then oxidize the acrolein to acrylic acid in a second reactive stage. Conventional two-stage reactors may comprise, for example, a single-shell reactor system (an "SRS"), a tandem reactor system, or a staged-air tandem reactor system, all of which are well known to those skilled in the art.

The output from the catalytic reactor is a hot mixed gas stream comprising acrylic acid, unreacted propylene, nitrogen, and other impurities, such as water, carbon monoxide, carbon dioxide, and acrolein. The hot mixed gas stream passes into a separation step, which serves to separate the acrylic acid from the impurities.

Conventional separation steps typically comprise equipment such as absorbers or extraction columns. The separation step produces at least two streams: a crude product stream comprising primarily acrylic acid, and a waste stream comprising primarily impurities.

The crude product stream is typically further processed to produce product grade acrylic acid or other products, such as acrylic acid esters. The waste stream is typically fed to an incineration step, along with supplemental fuel, such as natural gas, and an oxygen-containing gas stream, such as atmospheric air or oxygen-enriched air. The incineration step typically comprises processing equipment such as thermal oxidizers, incinerators, furnaces, or other combustors suitable for providing high-efficiency destruction of waste streams. In the incineration step, the waste stream is combusted or thermally decomposed to create an effluent stream, comprising inerts - such as water and carbon dioxide - and also thermal NO_x. Examples of conventional processes for producing acrylic acid can be found in U.S. Patent Nos. 5,817,865; 6,166, 248; and 6,350,906.

That is, the **Conventional Acrylic Acid Industrial Processes** include the steps of:

- producing a crude acrylic acid comprising a hot mixed gas stream by feeding a reaction feed mixture through an inlet of a reaction vessel, and passing the reaction product through an outlet of the reaction vessel;
- separating the mixed gas stream e.g. – in a separator column) into a crude product stream and a waste stream;
- incinerating the preheated waste stream by directing it into an incinerator along with supplemental fuel and oxygen-containing streams, wherein the gaseous emissions comprise at least one of the following: nitrogen dioxide, nitric oxide, and carbon monoxide.

The **Conventional Acrylic Acid Industrial Processes** disclosed by applicant include the steps of applicant's claimed method with possible exception to:

- producing a cooled mixed gas stream by directing the hot mixed gas stream through a heat exchanger system to form a preheated waste gas stream; and
- "preheated" supplemental fuel.
- "preheated" oxygen-containing stream.

US003977832 (SCHOFIELD) shows and discloses a method for reducing the emission of gaseous products into the atmosphere. See the discussion of **US003977832 (SCHOFIELD)** appearing herein above.

In regard to claims **1-5** and **8-10**, for the purpose of reducing the emission of gaseous products into the atmosphere, it would have been obvious to a person having ordinary skill in the art to modify a **Conventional Acrylic Acid Industrial Process** to include a cooled mixed gas stream by directing the hot mixed gas stream through a heat exchanger system to form a preheated waste gas stream and to incinerate the preheated waste gas stream along with a preheated supplemental fuel and a preheated oxygen-containing stream, in view of the teaching of **US003977832 (SCHOFIELD)**.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a)

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Conventional Acrylic Acid Industrial Processes** in view of **US003977832 (SCHOFIELD)** as applied to claim 1 above, and further in view of **US004230669 (EAGLE et al)**.

The **Conventional Acrylic Acid Industrial Processes** disclosed by applicant include the steps of applicant's claimed method with possible exception to:

- a shell and tube exchanger comprising a shell portion and a tube portion, and a series of disk-shaped and donut-shaped baffles.

US004230669 (EAGLE et al) teaches, form the same industrial processes and heat exchanger field of endeavor as **Conventional Acrylic Acid Industrial Processes** and **US003977832 (SCHOFIELD)**, using a shell and tube exchanger as a suitable means for transferring useful heat from one process stream to a second process stream.

In regard to claims 6 and 7, for the purpose of providing a suitable means for transferring useful heat from the hot mix process stream to the waste stream, it would have been obvious to a person having ordinary skill in the art to use a shell and tube exchanger, in view of the teaching of **US004230669 (EAGLE et al)**. Furthermore, in order to prevent undesirable solidification of any constituent of the product stream, the hot process stream would necessarily be maintained above the respective constituent's melting points. Thus, as an obvious design expedient, it would have been obvious to a person having ordinary skill in the art to configure the heat exchanger to maintain the respective constituent's of the hot gas stream above their melting points. Additionally, since the arrangement of a given heat exchanger would necessarily depend on numerous design concerns such as the overall size and shape of the process system components, the type of material being processed or produced, the amount of material being produced, etc. to arrange a series of disk-shaped and donut-shaped baffles disposed within the shell and tube exchanger's shell portion in the manner set forth in applicant's claim 7 can be viewed as nothing

more than a mere matter of choice in design absent the showing of any new or unexpected results produced therefrom over the prior art of record.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

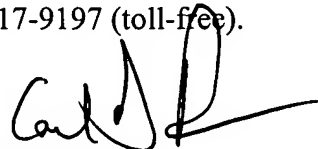
USPTO CUSTOMER CONTACT INFORMATION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CARL D. PRICE whose telephone number is (571) 272-4880. The examiner can normally be reached on Monday through Friday between 6:30am-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ehud Gartenberg can be reached on (571) 272-4828. The fax hone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Carl D. Price', with a stylized flourish extending from the end.

CARL D. PRICE
Primary Examiner
Art Unit 3749

CP